

# Shared mental models and shared temporal cognitions

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## SUMMARY

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Organizations increasingly rely on teams to accomplish cognitively and intellectually complex and demanding tasks. In order to perform such tasks successfully, team members need to develop a shared representation of knowledge about important aspects of teamwork. In other words, team members need to have shared mental models – a common understanding among team members about the task, team and temporal aspects of work –, and shared temporal cognitions – a common representation of knowledge about deadlines and the use of time during the task. The main goal of this thesis is to analyze the effects of shared mental models and shared temporal cognitions on team processes and team effectiveness over time. More specifically, this thesis has three goals. First, to analyze the hypothesis that shared mental models and shared temporal cognitions are basic initial conditions that promote a fruitful team functioning. Second, to analyze the effect of shared mental models and shared temporal cognitions on functional and dysfunctional team processes and in turn on team effectiveness. Third, to integrate time in team cognition research by following two distinct approaches: (1) by analyzing time-related constructs and relating them with shared mental models and shared temporal cognitions; and (2) by measuring shared mental models, shared temporal cognitions, team processes and team effectiveness in different time moments, as well as by analyzing the combined effect of shared mental models and team learning behaviors on team performance over time.

Chapter 1 aims to contextualize the research made in this thesis. This chapter starts with definitions of teams and teamwork. The most commonly used team effectiveness models are explained, as well as the main mechanisms and factors that influence team effectiveness and that guided this work. Then, building on cognitive psychology, it is explained how individuals acquire and use knowledge, distinguishing mental models from schemas. In addition, it is explained how social and organizational researchers integrate cognitive psychology in their research, and how teams process information and build a shared representation of knowledge. Finally, shared mental models and shared temporal cognitions are conceptualized and the (un)explored mechanisms on the relationship of shared mental models and shared temporal cognitions with team effectiveness are presented.

Chapter 2 describes a study that analyzes whether similar mental models (team and task dimensions) at the beginning of the team lifecycle influence the level of relationship conflict, shared mental model similarity at the middle of the team lifecycle, and in turn team

effectiveness (team performance, satisfaction, and viability). This study also analyzes whether shared mental models become more similar from the beginning to the middle of the team lifecycle. In the study, 92 teams (3-5 members) performed in a management simulation over five weeks. The results indicate that relationship conflict mediates the relationship between team mental model similarity at the beginning of the team lifecycle and team effectiveness at the end of the team lifecycle. Relationship conflict does not mediate the effect of task mental model similarity on team effectiveness. In addition, task mental models similarity at the middle of the team lifecycle mediates the relationship between task mental models at the beginning of team lifecycle and team effectiveness at the end of the team lifecycle. Finally, no support was found for an increase in similarity of shared mental models from the beginning to the middle of the team lifecycle.

Chapter 3 describes a study that analyzes the mediating mechanisms of intragroup conflict (task, relationship, process and temporal conflict) and creativity in the relationship between shared mental models and team effectiveness (team performance and satisfaction). In the shared mental models literature, it has been discussed whether shared mental models stifle creativity or promote it. In this study it is proposed that shared mental models facilitate team creativity because this ensures that members' working styles are aligned, which enables them to effectively coordinate their work. The model was tested in a sample of 161 teams (735 individuals) performing in a management simulation over five weeks. Findings of the study suggest that intragroup conflict mediates the relationship between shared mental models and satisfaction. However, intragroup conflict does not mediate the relationship between shared mental models and team performance. Importantly, creativity positively mediates the relationship between shared mental models and team effectiveness. Finally, intragroup conflict and creativity sequentially mediate the relationship between shared mental models and team effectiveness.

Chapter 4 describes a study that analyzes the effect of temporal leadership and shared temporal cognitions in reducing temporal conflict, and in facilitating team performance. What is more, this study analyzes whether shared temporal cognitions can substitute for temporal leadership in lowering temporal conflict. By combining two types of coordination mechanisms, this chapter postulates that an implicit coordination mechanism – shared temporal cognitions – may substitute an explicit coordination mechanism – temporal leadership – in diminishing temporal conflict. More specifically, it is argued that when shared temporal cognitions are high, teams do not need temporal leadership, and that both temporal

leadership and shared temporal cognitions can compensate for the lack of the other. The model was tested in a sample of 142 teams (650 individuals) performing in a management simulation over five weeks. Findings of the study indicate that temporal conflict mediates the relationship between temporal leadership and team performance, and the relationship between shared temporal cognitions and team performance. Moreover, findings indicate that shared temporal cognitions function as a substitute of temporal leadership in reducing temporal conflict. Thus, as expected, when shared temporal cognitions are high, there is no need for temporal leadership in order for teams to experience low levels of temporal conflict.

Chapter 5 contains an investigation of the moderating effect of temporal mental model accuracy on the relationship between temporal mental model similarity and team learning. Further, this chapter analyzes the mediating mechanism of team adaptation in the relationship between team learning and performance. It is argued that sharing an inaccurate mental model leads to closed minds. In particular, when team members have an inaccurate temporal mental model, similar mental models lead them to engage less in team learning behaviors. In the study, 68 teams (319 individuals) performed in a management simulation over five weeks. Findings indicate that when temporal mental model accuracy is high, similarity is not significantly related to team learning; while when accuracy is low, the more similar the temporal mental model is, the less team members engage in learning behaviors. Therefore, shared mental models can lead to closed-mindedness when the knowledge the team members share is incorrect. In addition, our findings suggest that team adaptation mediates the relationship between team learning and performance.

Chapter 6 describes a study that integrates a team process and a learning curve perspective on team learning. This chapter adopts a longitudinal approach by measuring team performance repetitively over time, and by using team learning processes and shared mental models to predict the temporal trajectory of team performance. More specifically, this chapter analyzes the effect of team learning processes on team performance improvement; and whether this relationship is moderated by task, team, and temporal mental models similarity. The model was tested in a sample of 67 teams (314 individuals) performing in a management simulation over five weeks. The findings suggest that team learning behaviors do not have a direct effect on team performance improvement. Temporal and task mental models are crucial for the translation of team learning behaviors into performance improvement. In particular, the findings suggest that when teams have similar task and temporal mental models, engaging in team learning processes is beneficial; whereas when teams have dissimilar task and temporal

mental models, engaging in team learning processes is detrimental to performance improvement. The findings fail to support the moderating role of team mental model similarity.

The studies reported in this thesis highlight the important role of shared mental models and shared temporal cognitions established early in the team lifecycle for team processes and team effectiveness. In addition, the studies highlight the importance of time-related constructs of team functioning, and the importance of analyzing teams over their lifecycle. Although more research is needed to further investigate the antecedents, consequences, and boundary conditions of shared mental models and shared temporal cognitions, the studies reported in this thesis provide avenues for future research about these two cognitive constructs. In particular, it provides important suggestions on how to analyze how shared mental models and shared temporal cognitions emerge and develop over time. This thesis presents a number of practical implications for teams, team leaders, and human resources managers.

